



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2015-7491; Directorate Identifier 2015-NE-39-AD; Amendment 39-18569; AD 2016-13-05]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for all General Electric Company (GE) GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines. This AD was prompted by an uncontained failure of the high-pressure compressor (HPC) stage 8-10 spool, leading to an airplane fire. This AD requires eddy current inspection (ECI) or ultrasonic inspection (USI) of the HPC stage 8-10 spool and removing from service those parts that fail inspection. We are issuing this AD to prevent failure of the HPC stage 8-10 spool, uncontained rotor release, damage to the engine, and damage to the airplane.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: See the For Further Information Contact section.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2015-7491; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments

received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: John Frost, Aerospace Engineer, Engine Certification Office, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7756; fax: 781-238-7199; email: john.frost@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all GE GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines. The NPRM published in the *Federal Register* on January 13, 2016 (81 FR 1582). The NPRM was prompted by an uncontained failure of the HPC stage 8-10 spool, leading to an airplane fire. The NPRM proposed to require ECIs or USIs of the HPC stage 8-10 spool and removing from service those parts that fail inspection. We are issuing this AD to prevent failure of the HPC stage 8-10 spool, uncontained rotor release, damage to the engine, and damage to the airplane.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM (81 FR 1582, January 13, 2016) and the FAA's response to each comment.

Support for the NPRM (81 FR 1582, January 13, 2016)

The Air Line Pilots Association expressed support for the NPRM (81 FR 1582, January 13, 2016).

Request to Change Applicability

British Airways, United Airlines, and The Boeing Company commented that HPC stage 8-10 spool, part numbers (P/Ns) 1844M90G01 and 1844M90G02 are not required in the Applicability paragraph of this AD. They noted that the associated AD 2015-27-01, (81 FR 1291, January 12, 2016) and the precipitating event involved only HPC stage 8-10 spool, P/N 1694M80G04.

We disagree. HPC stage 8-10 spool P/Ns 1844M90G01 and 1844M90G02 are susceptible to the same failure mode as HPC stage 8-10 spool, P/N 1694M80G04. However, we acknowledge that the one-time inspection is not needed for the majority of HPC stage 8-10 spool P/Ns 1844M90G01 and 1844M90G02. Therefore, we revised paragraph (e)(1) of this AD to apply to only specific serial numbers (S/Ns) of P/Ns 1844M90G01 and 1844M90G02 for the one-time inspection.

Request to Change Compliance Time

British Airways requested that we clarify if a repetitive on-wing inspection is required. They reasoned that the service information lists the on-wing inspection as one time only.

We disagree. Paragraph (e)(1) of this AD mandates that specific parts be inspected prior to a cycle limit. This initial inspection may be performed on wing using USI or at shop visit using ECI. Repetitive inspections prior to shop visit are not mandated, however we acknowledge that GE has commented that they should be performed. We did not change this AD.

Request to Change Terminating Action

GE requested that we remove the repetitive shop visit inspection from the Compliance section of this AD and instead mandate that the airworthiness limitations section (ALS) of the engine manual include the repetitive inspections. They also requested that the Summary section and Related Information section of this AD be

revised to reflect this change. They reasoned that this will allow a terminating action for this AD.

We disagree. At this time we do not feel that a change to the ALS is appropriate as root cause has not been determined. We did not change this AD.

Request to Change Installation Prohibition

GE requested that we clarify that the installation prohibition does not apply to new parts. They stated that new parts do not need to be inspected prior to installation. The inspections are only applicable to parts that have been used in service.

We agree. We revised paragraph (f) of this AD to specify that inspections are only required for parts that have been used in service.

Request to Change Service Information

GE and British Airways requested that we revise the Related Service Information paragraph of this AD to remove the reference to Engine Manual, Chapter 72-00-31, Special Procedure 007 and add a reference to GE GE90 SB 72-1146. They reasoned that the Special Procedure is considered an additional inspection technique and the other inspection procedures listed provide full detection capability of defects in the area of concern.

We disagree. The service information is not incorporated by reference in this AD and was previously included for information purposes only. However, to preclude any confusion on this point, we removed all service information from the Related Information section of this AD.

Request to Change Applicability

GE requested that we reduce the applicability for the initial inspection. GE has determined that an older manufacturing process may be a contributor to part failure and that all parts manufactured using this process should be inspected prior to shop visit.

We agree. We revised the applicability of the initial inspection to include all HPC

stage 8-10 spool, P/N 1694M80G04, and specific S/Ns of HPC stage 8-10 spool, P/Ns 1844M90G01 and 1844M90G02, that were manufactured using the older process.

Request to Change Compliance Time

GE has requested that the initial USI compliance time be reduced and to add repetitive inspections every 500 cycles until shop visit ECI for the parts manufactured using the older manufacturing process noted above. GE has determined that the smallest detectable flaw using USI with the compressor blades installed is larger than what was used in the prior analysis.

We partially agree. We agree that the USI inspection is not as capable as what was used in the prior analysis. We also agree that a reduced threshold for initial inspection is appropriate. So, we reduced the initial inspection threshold in paragraph (e)(1) of this AD from 10,500 cycles to 9,000 cycles and removed USI as an option for the inspections in paragraph (e)(2) of this AD. We disagree with including the 500 cycle repetitive inspections; however, repetitive inspections would be a consideration for additional rulemaking.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM (81 FR 1582, January 13, 2016) for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM (81 FR 1582, January 13, 2016).

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

Interim Action

GE is determining the root cause for the unsafe condition identified in this AD. Once a root cause is identified, we will consider additional rulemaking.

Costs of Compliance

We estimate that this AD affects 54 engines installed on airplanes of U.S. registry. We also estimate that it will take about 7 hours per engine to comply with this AD. The average labor rate is \$85 per hour. We estimate one part will fail inspection at a cost of \$780,000. Based on these figures, we estimate the total cost of this AD to U.S. operators to be \$812,130.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

- 2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2016-13-05 **General Electric Company:** Amendment 39-18569; Docket No. FAA-2015-7491; Directorate Identifier 2015-NE-39-AD.

(a) Effective Date

This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to General Electric Company (GE) GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines with a high-pressure compressor (HPC) stage 8-10 spool, part numbers (P/Ns) 1694M80G04, 1844M90G01, or 1844M90G02, installed.

(d) Unsafe Condition

This AD was prompted by an uncontained failure of the HPC stage 8-10 spool. We are issuing this AD to prevent failure of the HPC stage 8-10 spool, uncontained rotor release, damage to the engine, and damage to the airplane.

(e) Compliance

Comply with this AD within the compliance times specified, unless already done.

(1) For HPC stage 8-10 spool, P/N 1694M80G04, all serial numbers (S/Ns), or HPC stage 8-10 spool, P/N 1844M90G01 or 1844M90G02, with a S/N listed in Figure 1 to paragraph (e) of this AD; perform an eddy current inspection (ECI) or ultrasonic inspection (USI) of the stage 8 aft web upper face, after reaching 8,000 cycles since new (CSN), but, before exceeding 9,000 CSN, or within 500 cycles in service after the effective date of this AD, whichever occurs later.

Figure 1 to Paragraph (e) – HPC Stage 8-10 Spool S/Ns

Part Numbers	Serial Numbers				
1844M90G01	GWN005MF	GWNBK753	GWNBS077	GWNBS497	GWNBS724
	GWN005MG	GWNBK754	GWNBS078	GWNBS499	GWNBS794
	GWN0087M	GWNBK841	GWNBS079	GWNBS500	GWNBS810
	GWN0087N	GWNBK842	GWNBS080	GWNBS501	GWNBS811
	GWN00DGK	GWNBK843	GWNBS081	GWNBS502	GWNBS812
	GWN00DGL	GWNBK844	GWNBS157	GWNBS609	GWNBS813
	GWNBK992	GWNBK952	GWNBS158	GWNBS610	GWNBS814
	GWNBK667	GWNBK953	GWNBS159	GWNBS611	GWNBS910
	GWNBK674	GWNBK954	GWNBS160	GWNBS612	GWNBS911
	GWNBK675	GWNBK955	GWNBS266	GWNBS613	GWNBS912
	GWNBK743	GWNBK956	GWNBS267	GWNBS614	GWNBS914
	GWNBK744	GWNBK957	GWNBS268	GWNBS721	GWNBS915
	GWNBK751	GWNBK958	GWNBS269	GWNBS722	GWNBS982
	GWNBK752	GWNBK959	GWNBS270	GWNBS723	GWNBS983
1844M90G02	GWN00C2T	GWN01C5N	GWN02N8D	GWN03RTM	GWN04E21
	GWN00C2V	GWN01GE2	GWN02T3R	GWN03RTP	GWN04GHT
	GWN00G2N	GWN01GE3	GWN02WGM	GWN040RL	GWN04GHW
	GWN00G2P	GWN01GE4	GWN0311K	GWN040RM	GWN04GJ0
	GWN00PFP	GWN01GE6	GWN035PP	GWN040RN	GWN04JW6
	GWN00PFR	GWN01WH1	GWN038TD	GWN040RP	GWN04JW7
	GWN00T2N	GWN02688	GWN039TG	GWN04202	GWN04JW8
	GWN00YHV	GWN02689	GWN03G2R	GWN0435W	GWN04L7K
	GWN0125G	GWN0268A	GWN03G2W	GWN04360	GWN04L7L
	GWN0125H	GWN02DP2	GWN03G30	GWN04361	GWN04MT7
	GWN0166K	GWN02DP3	GWN03JPC	GWN04362	GWN04MT8
	GWN01C5K	GWN02F9F	GWN03JPD	GWN04ATG	GWNBS984
	GWN01C5L	GWN02F9G	GWN03N8P	GWN04ATH	
	GWN01C5M	GWN02L9T	GWN03N8R	GWN04E20	

(2) For all HPC stage 8-10 spools, P/N 1694M80G04, 1844M90G01, or 1844M90G02, perform an ECI of the stage 8 aft web upper face of the HPC stage 8-10 spool at each shop visit.

(3) Remove from service any HPC stage 8-10 spool that fails the inspection required by paragraphs (e)(1) or (e)(2) of this AD, and replace with a spool eligible for installation.

(f) Installation Prohibition

After the effective date of this AD, do not re-install into any engine, any HPC stage 8–10 spool, P/Ns 1694M80G04, 1844M90G01, or 1844M90G02, unless the spool has passed an ECI of the stage 8 aft web upper face as specified in paragraph (e)(1) or (e)(2) of this AD.

(g) Definition

For the purpose of this AD, an engine shop visit is the induction of an engine into the shop for maintenance during which the compressor discharge pressure seal face is exposed.

(h) Alternative Methods of Compliance (AMOCs)

The Manager, Engine Certification Office, FAA, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request. You may email your request to: ANE-AD-AMOC@faa.gov.

(i) Related Information

For more information about this AD, contact John Frost, Aerospace Engineer, Engine Certification Office, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7756; fax: 781-238-7199; email: john.frost@faa.gov.

(j) Material Incorporated by Reference

None.

Issued in Burlington, Massachusetts, on June 15, 2016.

Colleen M. D'Alessandro,
Manager, Engine & Propeller Directorate,
Aircraft Certification Service.

[FR Doc. 2016-14474 Filed: 6/23/2016 8:45 am; Publication Date: 6/24/2016]